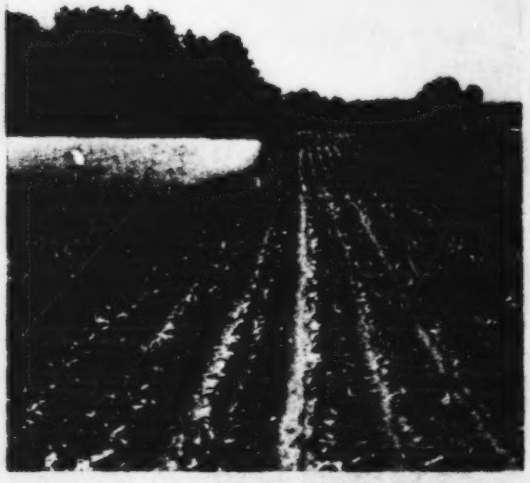
Economics Information

Ontario

THE ECONOMICS OF PRODUCING FLUE-CURED TOBACCO IN ONTARIO



ECONOMICS BRANCH

ONTARIO MINISTRY OF AGRICULTURE AND FOOD
LEGISLATIVE BUILDINGS, TORONTO, ONTARIO, M7A 1B6

ACKNOWLEDGMENTS

This report was made possible by the cooperation of a group of farmers in the counties of Brant, Elgin, Oxford, and in the regional municipality of Haldimand-Norfolk, who contributed information on their flue-cured tobacco crops.

Special acknowledgments are due to the staff members of the Economics Branch for their assistance in collecting the field data and the office tabulating, typing and editing the information for this report.

Cover photographs courtesy of the Ontario Flue-Cured Tobacco Growers' Marketing Board, Tillsonburg, Ontario.

ECONOMICS INFORMATION

THE ECONOMICS OF PRODUCING FLUE-CURED TOBACCO IN ONTARIO

by
G.A. Fisher

Economics Branch
Ontario Ministry of Agriculture and Food
Legislative Buildings Queen's Park
Toronto, Ontario M7A 1B6
January 1983

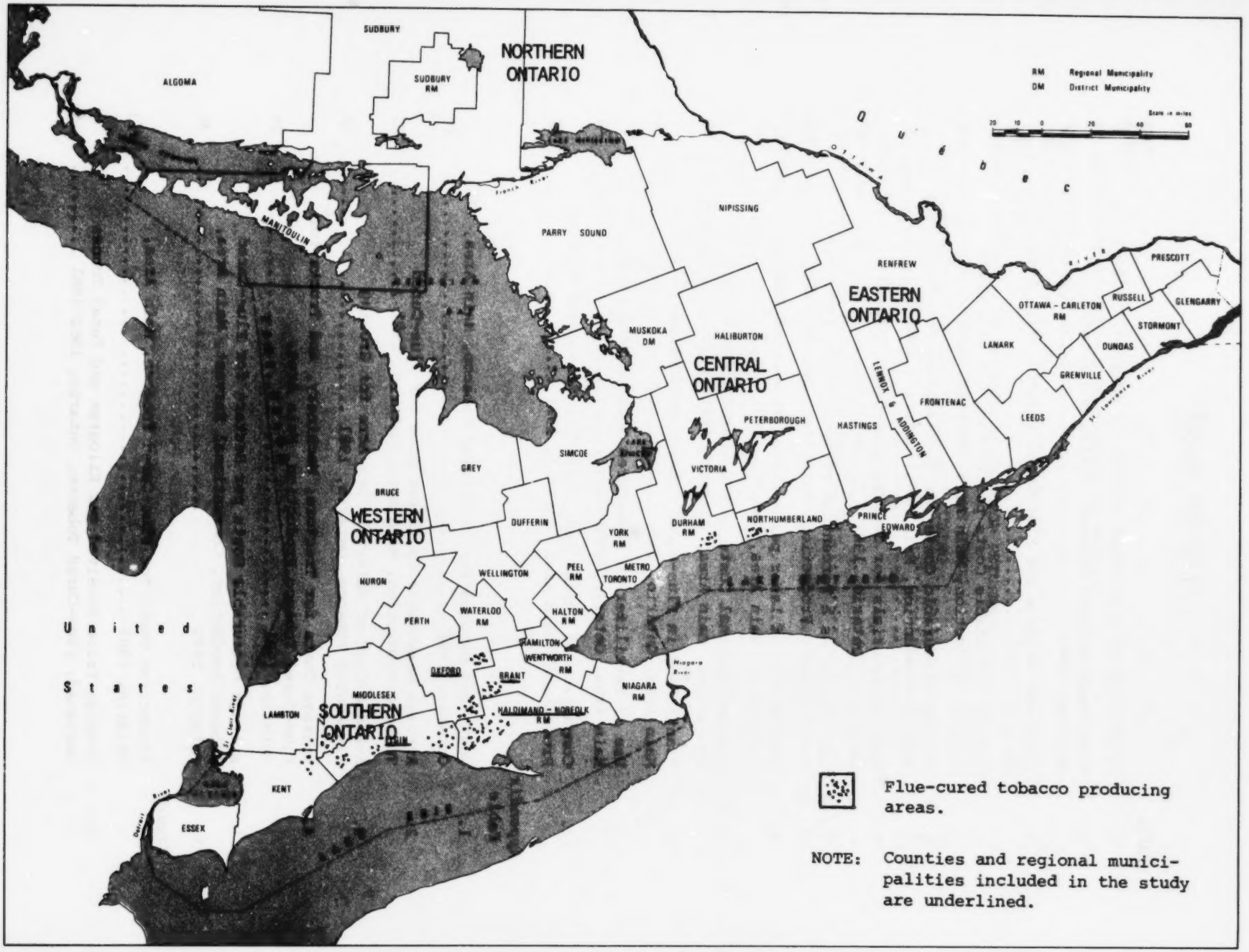
ISBN 0-7743-8102-7

TABLE OF CONTENTS

	Page
SUMMARY	vi
THE PRODUCTION OF FLUE-CURED TOBACCO IN ONTARIO	1
ORGANIZATION OF THE STUDY	5
Objectives of the Study	5
Selecting the Sample of Growers	6
TREATMENT OF COSTS OF PRODUCTION AND CROP RETURNS	7
VARIATION IN COSTS AND RETURNS FOR FARMS USING DIFFERENT METHODS OF HARVESTING AND CURING	13
Gross Returns	13
Production Costs	14
Labor Costs	18
Seasonal Costs	21
Practices Used by Growers in This Study	22
APPENDIX	26
REFERENCES	31

LIST OF TABLES

Table		*Page*
1.	Production of Flue-Cured Tobacco in Ontario, 1962-81	2
2.	Flue-Cured Tobacco Acreage, Yields and Returns, Ontario, 1981	3
3.	Costs and Returns for Flue-Cured Tobacco, Main Area, Ontario, 1981	14
4.	Average Measurable Costs per Hectare for Flue-Cured Tobacco Production, Main Area, Ontario, 1981	15
5.	Average Measurable Costs per 50 Kilograms for Flue-Cured Tobacco Production, Main Area, Ontario, 1981	16
6.	Cost of Materials for Growing Flue-Cured Tobacco, Main Area, Ontario, 1981	17
7.	Cost Inputs as a Percentage of Total Costs for Flue-Cured Tobacco Production, Main Area, Ontario, 1981	18
8.	Average Use of Labor per Hectare, Flue-Cured Tobacco Production, Main Area, Ontario, 1981	19
9.	Average Seasonal Costs in Flue-Cured Tobacco Production, Main Area, Ontario, 1981	20
10.	Plants Used in Flue-Cured Tobacco Production, Main Area, Ontario, 1981	21
11.	Use of Fertilizer in Flue-Cured Tobacco Production, Main Area, Ontario, 1981	22
12.	Comparison of Curing Fuel Costs for Flue-Cured Tobacco Production, Main Area, Ontario, 1981	25
Appendix Table		
1.	Costs and Returns for Flue-Cured Tobacco, Main Area, Ontario, 1981	26
2.	Average Measurable Costs per Acre for Flue-Cured Tobacco Production, Main Area, Ontario, 1981	27
3.	Average Cost of Materials per Acre for Growing Flue-Cured Tobacco, Ontario, 1981	28
4.	Average Costs for Tractors, Machinery, and Trucks for Flue-Cured Tobacco Production, Main Area, Ontario, 1981	29
5.	Average Measurable Costs per Hectare for Flue-Cured Tobacco Production, Conventional Harvest, Main Area, Ontario, 1974	30
Figure		
1.	Production Costs for Flue-Cured Tobacco, Main Area, Ontario, 1981	vii
2.	Average Price Received per Kilogram and Total Tonnes Marketed, Flue-Cured Tobacco, Ontario, 1962-1981	4


SUDBURY
NORTHERN ONTARIO
ALGOMA
SUDBURY RM
RM Regional Municipality
DM District Municipality
Quebec
NIPISSING
PARRY SOUND
MANITOULIN
RENFREW
EASTERN ONTARIO
PRESCOTT
RUSSELL
GLENGARRY
OTTAWA - CARLETON RM
STORMONT
DUNDAS
LANARK
GRENVILLE
MUSKOKA DM
HALIBURTON
CENTRAL ONTARIO
LENNOX & ADDINGTON
FRONTENAC
LEEDS
PETERBOROUGH
HASTINGS
SIMCOE
GREY
VICTORIA
BRUCE
WESTERN ONTARIO
DUFFERIN
YORK RM
DURHAM RM
NORTHUMBERLAND
PRINCE EDWARD
PEEL RM
METRO TORONTO
WELLINGTON
HURON
PERTH
WATERLOO RM
HALTON RM
HAMILTON WENTWORTH RM
United States
OXFORD
BRANT
NIAGARA RM
MIDDLESEX
LAMBTON
SOUTHERN ONTARIO
HALDIMAND - NORFOLK RM
ESSEX
KENT
Flue-cured tobacco producing areas.
NOTE: Counties and regional municipalities included in the study are underlined.

SUMMARY

In 1981, nearly 100 million kilograms of Ontario flue-cured tobacco were sold by auction; the total farm value was just over $334 million. Although the crop is grown in 14 counties and regional municipalities, 91 percent of the production is concentrated in the counties of Brant, Elgin, and Oxford and in the regional municipality of Haldimand-Norfolk. In terms of gross farm receipts, flue-cured tobacco ranked as the number-one crop in Ontario for 1981.

The average yields per hectare for five-year periods increased by 432 kilograms per hectare, from 1 966 kilograms for 1962-66 to 2 398 kilograms for 1972-76. For the period 1977-81, unpredictable outbreaks of disease, such as the outbreaks of Blue Mould disease in 1979, and extremes of weather, reduced the five-year average yield to 1 733 kilograms per hectare.

Although tobacco growers have been increasing their production per hectare and have been receiving higher prices for their crop, they have also been faced with constantly rising production costs. A comparison of the costs of production between the study in 1974 and the one in 1981 shows the following.

For conventional harvesting (with priming aid, machine tying, and curing in standard kilns), the operating, or cash, costs in 1974 were $2,320 per hectare and $4,633 in 1981; that was a 100 percent increase, or an average annual increase of over 14 percent.

The gross returns per kilogram of tobacco sold by conventional-harvest growers were $2.00 per kilogram in 1974 and $3.35 in 1981; that was a 68 percent increase, or an increase of about 10 percent per year.

The 42 growers studied in 1981 harvested an average of 2 416 kilograms per hectare and, owing to production allotments, marketed 2 221 kilograms with an average carry-over into the 1982 marketing year of 195 kilograms per hectare.

The 42 study farms were divided into three groups according to the method used in harvesting and curing:

1. Priming aid and curing in bulk kilns;
2. Priming aid and curing in standard kilns; and
3. Mechanical harvesting and curing in bulk kilns.

The total measurable cost per 50 kilograms for all growers was $151.06; and priming aid and bulk cured, the cost was $152.72; for priming aid and standard cured, $144.90; and for mechanical harvest, $165.91.

As a percentage of total measurable costs for all growers in the study, the largest expense was hired labor (23 percent), followed by materials (17 percent), use of buildings (13 percent), tractors and machines (12 percent), operator's labor (10 percent), land (6 percent), allowance for management (5 percent), and insurance and quota rentals (4 percent each). The remaining 6 percent was made up by a number of miscellaneous inputs including interest on operating capital and the Marketing Board fee (Figure 1). Several of the more significant inputs were:

Labor. For mechanical harvest, 5.9 hours of labor were needed for every 50 kilograms, compared to 8.6 for the bulk group and 8.9 for growers using a priming aid and standard kilns.

Plants. For harvesting in field by the use of a priming aid, the average number of plants used was 16,075 per hectare; for mechanical harvesting, 16,675 plants per hectare were used.

Fertilizer. The average grower in the study used 1 301 kilograms of fertilizer per hectare: 151 kilograms during field preparations, 1 004 at the time of planting, and 146 during side-dressing operations.

Curing fuel. For all growers in this study, 61 percent of the tobacco was cured by natural gas at a cost of $4.70 per 50 kilograms for bulk kilns and $6.46 for standard kilns. Twenty-four percent of the tobacco was cured by using oil at a cost of $11.20 per 50 kilograms in bulk kilns and $12.22 in standard kilns. The remaining 15 percent of the tobacco crop was cured with propane at a cost of $10.48 per 50 kilograms in bulk kilns and $12.00 in standard kilns.

Figure 1.—Production Costs for Flue-Cured Tobacco, Main Area, Ontario, 1981

THE PRODUCTION OF FLUE-CURED TOBACCO IN ONTARIO

In 1981, there were almost 100 million kilograms of Ontario flue-cured tobacco sold by auction; the total farm value was more than $334 million. In terms of gross farm cash receipts, flue-cured tobacco ranked as the number-one crop for the Province. That figure represents almost 20 percent of Ontario's cash receipts from crop sales and 7 percent of the total receipts from all farming operations.

Flue-cured tobacco was grown and marketed from 14 counties or regional municipalities of Ontario in 1981 (see map). Ninety-one percent of the marketed production was grown in the counties of Brant, Elgin, and Oxford, and in the regional municipality of Haldimand-Norflk. The rest was grown as follows: Middlesex, 5 percent; Durham, Essex and Kent, and Northumberland, 1 percent each; and 1 percent Bruce, Dufferin, Lambton, Simcoe, and Waterloo combined (Table 2). During the period from 1962 to 1981, the area devoted to the production of flue-cured tobacco in Ontario ranged from a low of 29 740 hectares in 1964 to a high of 51 850 hectares in 1967. In the same period total production ranged from a low of 61 980 tonnes in 1964 to a high of 108 000 tonnes in 1974 (Table 1). The amount of flue-cured tobacco marketed each year fluctuates drastically, as shown in Figure 2. The extreme fluctuations over the years are caused by one or a combination of the following factors:

1. The targeted production set for each year varies with the anticipated demand by tobacco buyers;

2. Inclement weather, such as heavy rainfall, hail, wind, and frost may damage the crop. In 1981 some areas were affected by excessive rainfall; and

3. Diseases or infestations of insects may damage the crop. The most notable in recent years was the outbreak of Blue Mould disease in 1979. Because of the disease, the average quantity marketed was only 1 733 kilograms per hectare, the lowest in almost 15 years of tobacco growing in Ontario (Table 1).

Yield per hectare is no longer as significant as it was before the introduction of poundage allotments in 1976. Nevertheless, the average tobacco yield per hectare in Ontario was gradually increasing before the 1979 setback. The average yield was almost 22 percent higher for the five-year period 1972-76 than for 1962-66 (Table 1).

Before each crop year begins, the tobacco-buying companies and the Marketing Board study the world tobacco situation, including stocks on hand, potential production, domestic demand and demand for exports. Through negotiation, the Board establishes a total yield (targeted production) from the coming year's crop that it can reasonably expect to sell. It then allots a poundage, based on each farm's base quota, to be grown on each registered tobacco farm.

Before 1976, the production allotment made to each registered tobacco farm was based on an acreage that was strictly controlled. Under that system, growers tended to grow more plants to increase their per acre production, all of which could be marketed.

Table 1.—Production of Flue-Cured Tobacco in Ontario, 1962-81

Crop year	Hectares harvested	Total production, green wt.	Per hectare	
			Yield	Gross value
	number	tonnes	kg	$
1981	48 145	99 735	2 072	6,939
1980	44 515	96 930	2 177	6,551
1979	39 050	67 690	1 733	5,080
1978	40 000	104 140	2 600	6,798
1977	35 330	92 920	2 630	6,345
1976	33 430	72 140	2 158	4 857
1975	35 490	95 050	2 678	5,551
1974	44 010	108 000	2 454	4,878
1973	42 360	105 590	2 493	4,364
1972	35 080	75 630	2 156	3,707
1971	33 440	91 720	2 743	3,922
1970	37 350	90 430	2 421	3,472
1969	47 620	102 940	2 162	3,154
1968	49 400	91 330	1,849	2,892
1967	51 850	89 190	1 720	2,610
1966	47 570	97 470	2 049	3,221
1965	35 160	70 000	1 991	2,889
1964	29 740	61 980	2 084	2,556
1963	40 280	81 780	2 030	2,051
1962	47 180	81 680	1 731	1,948
5-year average				
1977-81	41 408	92 283	2 229	6,376
1972-76	38 072	91 282	2 398	4,670
1967-71	43 932	93 122	2 120	3,138
1962-66	39 986	78 582	1 966	2,527

Source: *Agricultural Statistics for Ontario,* (Toronto: Ontario Ministry of Agriculture and Food, Publication 20, 1962-81).

In 1976, the flue-cured tobacco crop was grown on a poundage basis for the first time. Under this system the tobacco grower is allowed to market a certain poundage with no restriction on acreage. The change was made at the request of the Canadian Tobacco Manufacturers' Council and the United Kingdom buyers, who hoped it would produce more desired types of tobacco. The change was an incentive for growers to grow fewer plants per acre but to produce higher-quality tobacco.

When the Board made the conversion from acreage to poundage before the 1976 production year, it chose the highest yield for each farm for an eleven-year period including 1975. Three categories were set: a maximum of 1 182 kilograms, (2,600 pounds); a minimum of 1 045 kilograms, (2,300 pounds); and the actual yield.

Table 2.—Flue-Cured Tobacco Acreage, Yields and Returns, Ontario, 1981

County and regional municipality	Area grown, ha	Production, kg		Returns, $	
		Total mktd.	Per ha	Total	Per hectare
		'000		$'000	
MAIN AREA					
Brant	5 174	10 605	2 050	35,493	6,860
Elgin	8 044	16 248	2 020	54,409	6,764
Haldimand-Norfolk	25 410	53 641	2 111	179,645	7,070
Oxford	4 796	10 077	2 101	34,018	7,093
Total	43 424	90 571	2 086	303,565	6,991
SECONDARY AREA					
Durham	242	507	2 095	1,677	6,930
Essex & Kent	573	1 114	1 942	3,698	6,454
Middlesex	2 428	4 678	1 927	15,665	6,452
Northumberland	1 042	1 971	1 892	6,469	6,208
Other[a]	436	894	2 050	3,007	6,897
Total	4 721	9 164	1 941	30,516	6,464
ONTARIO	48 145	99 735	2 072	334,081	6,939

[a]Includes counties of Bruce, Dufferin, Lambton, Simcoe, and Waterloo.

Source: *Agricultural Statistics for Ontario, 1981,* Publication 20, Ontario Ministry of Agriculture and Food.

At the end of the 1976 production year, the Farm Products Marketing Board surveyed the producers for their opinions on two issues:

1. Whether they preferred acreage or poundage control; and

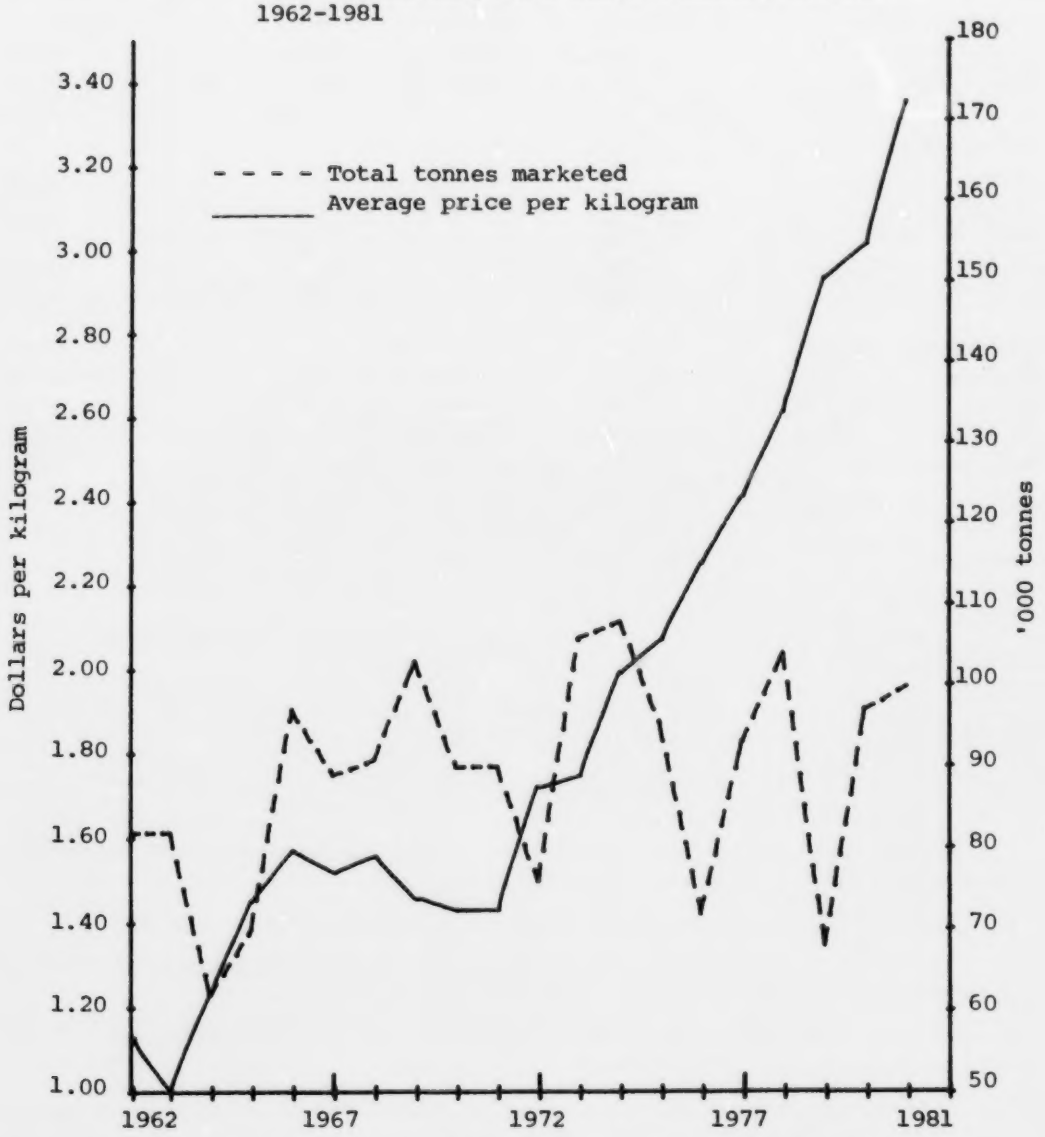
2. What method of allocation they preferred if poundage control was approved.

The growers voted decisively to accept the 1976 conversion formula permanently.

Another important step was taken by the Board when it passed the new General Regulations 1975-1976, which separated the basic tobacco acreage (poundage allotment) from the land. The new regulations allowed farmers to sell their tobacco-growing rights while retaining ownership of the land. As a result, tobacco-growing rights (poundage allotments) have over the years been moved from areas of marginal production to more productive areas with a history of fewer climatic risks.

Although growers had been growing tobacco for many years under poundage controls, a large surplus occurred in 1981. Many producers, after suffering the effects of poor crops due to Blue Mould and adverse weather, planted additional acres in hope of recouping the previous year's losses. With only a few growing areas suffering adverse weather, the surplus poundage created a strong demand for marketing quotas. As marketing time approached, the demand for the small amount of surplus marketing quotas

Figure 2.—Average Price Received per Kilogram and Total Tonnes Marketed, Flue-Cured Tobacco, Ontario, 1962-1981



Source: *Agricultural Statistics for Ontario*, Metric Edition, 1941-1978.

resulted in a rental that was too high to be economic. The estimated carry-over from the 1981 crop ranged from 11 340 to 13 600 tonnes. The targeted production for 1981 of 99 790 440 kilograms (220 million pounds) was met: 99 739 296 kilograms (219,887,246 pounds) was auctioned (Table 1).

Although the average price received for flue-cured tobacco varied every year from 1962 to 1981, the long-term trend indicated a general

increase — from a low of $1.01 per kilogram in 1963 to a high of $3.35 in 1981. Except for the drastic drops in certain years, especially in 1979, the amounts auctioned have come close to the targeted production or slightly exceeded it (Figure 2).

Increased yields and higher prices have led to higher gross returns per hectare for Ontario flue-cured tobacco. The average gross value of marketed production per hectare more than doubled during the 20 years from 1962 to 1981: from $2,527 per hectare during the period 1962-66 to $6,376 during the period 1977-81. In more recent years the gross value per hectare increased from $4,670 in the 1972-76 period to $6,376 in the 1977-81 period, amounting to an increase of $1,706 per hectare, or over 36 percent (Table 1).

Although yields per hectare have increased and prices have risen, the tobacco growers have been faced by constantly rising production costs. Flue-cured tobacco demands special cultural practices, including the use of many kinds of expensive pesticides, large amounts of fertilizers, and fuel for the energy-intensive process of curing. Comparing costs of production in the 1974 Economics Branch study with those in the latest study, in 1981, we find the following.

For conventional harvesting (using a priming aid, machine tying, and curing in standard kilns), the operating costs in 1974 were $2,320 per hectare and $4,633 in 1981; that represents a 100 percent increase, or an average increase of over 14 percent per year. The allowance for management fees calculated for 1981 was excluded from the comparison as this cost was not considered in 1974.

Gross returns per kilogram marketed by conventional growers were $2.00 in 1974 and $3.35 in 1981; that was an increase of 68 percent, or about 10 percent per year, a lower rate than for costs (Table 4 and Appendix Table 5).

ORGANIZATION OF THE STUDY

Since the study by the Economics Branch in 1974, *Flue-Cured Tobacco Production in Ontario, Production Costs and Returns, 1974,* the production quota described earlier for each farm has been changed from acres to pounds. Realizing the significance of the change for production practices and costs, the Ontario Flue-Cured Tobacco Growers' Marketing Board requested a production cost study for the 1981 crop.

OBJECTIVES OF THE STUDY

The flue-cured tobacco study had the following objectives:

1. To obtain data on the production costs and returns for producing flue-cured tobacco;

2. To compare the costs of growing, harvesting, and marketing flue-cured tobacco for the three main systems of harvesting and curing:

   a. priming aid and bluk cured,
   b. priming aid and standard cured,
   c. mechanical harvested and bulk cured; and

3. To provide data on the physical inputs into, and the cost of, growing, harvesting, curing, and marketing flue-cured tobacco. The data would be for use by growers, extension workers, and other interested persons.

HARVESTING AND CURING SYSTEMS

Harvesting requires a considerable amount of labor. The scarcity of good labor and increases in wages have encouraged a trend towards mechanization of the tobacco harvest. Over the years, the introduction of harvesting (priming) aid, bulk-curing kilns, and in recent years the mechanical harvester have all contributed to mechanization. The three principal methods of harvesting and curing studied in this report were:

1. Priming aid and cured in bulk kilns. Under this system, the labor crew consists of four primers who ride on the priming aid and pick the tobacco leaves as the aid travels through the field, an aid driver, and a boat driver who hauls the picked leaves to the kiln yard. At the kiln yard the leaves are placed in racks, which are placed in the bulk kiln for curing. For this system, a crew of eight is usually required.

2. Priming aid and cured in standard (conventional) kilns. The leaves are picked in the field and transported to the kiln yard as described for system 1. At the kiln yard the leaves are arranged on a tying machine so they can be tied on wooden slats. These slats loaded with tobacco leaves are then moved by an inclined elevator to the standard kiln, where the kiln hanger places the slats in the kiln for curing. For this system, a cres of 10 is usually required.

3. Mechanically harvested and bulk cured as tangled leaves. The leaves are picked from two rows in the field by a mechanical harvester as it moves through the field. Most growers have a driver and someone riding on the harvester to level the freshly picked leaves as they fall into the bin. The filled bins are hauled and moved directly into the bulk curing kiln without any further handling. For this system, a crew of three is usually required.

GRADING OPERATIONS

As the cured leaves come from the curling kilns, they are handled and sorted into grades by quality. Before the earlier opening of the tobacco auction, most growers did not begin grading until several weeks after the crop had been harvested and cured.

The use of bulk curing and the mechanical harvester has allowed producers to grade and bale the crop while harvesting is still in progress. Although the demand for grading labor competes with other demands for labor, the reduction in the need for labor due to the use of bulk curing and mechanical harvesters has offset this problem.

Because of the new methods of harvesting and grading, the 1981 tobacco auction opened on September 21, the earliest date ever, and some three weeks before the traditional mid-October opening.

SELECTING THE SAMPLE OF GROWERS

To provide a list of possible participants, the office of the Flue-Cured Tobacco Growers' Marketing Board sent a newsletter to all tobacco

growers in the main growing area (Elgin, Oxford, Brant, and Haldimand-Norfolk). The letter outlined the purpose of the study and asked each grower who was interested in cooperating to answer a short questionnaire and mail it back. The questionnaire asked for the name and address of the farm's owner, the location of the farm, the approximate quota to be marketed in 1981, and the harvesting system used: priming aid with bulk kilns, priming aid with standard kilns, or fully mechanized.

Two hundred and sixty-eight usable replies from the four counties in the study were received before the deadline of 28 February. From the replies, a list of names and alternates was randomly selected to give a beginning sample of 46 farms.

Because of the number of people and the time required to collect the data, the study was restricted to the main growing area of Brant, Oxford, Elgin, and Haldimand-Norfolk. The sample was further divided so as to represent the three main harvesting systems in use during 1981. The number of completed records totaled 42, consisting of 13 using priming aid and bulk cured, 22 using priming aid and standard kilns, and 7 using mechanically harvested and bulk cured. The distribution is shown below.

	Priming aid & cured by		
Location	*Bulk*	*Standard*	*Mechanically harvested*
Brant	2	2	1
Oxford	3	3	-
Elgin	3	5	2
Hald.-Norfolk ..	5	12	4
Total	13	22	7

TREATMENT OF COSTS OF PRODUCTION AND CROP RETURNS

Each participating grower was provided with forms to enable him to record all information accurately. The growers were encouraged to record the use of all tractors, machines, trucks, and materials for all operations performed and the other costs of producing the crop. Recording all labor hours was especially emphasized because of the importance of labor in tobacco production. Special care was taken to differentiate between unpaid family help and hired help, which included paid family help as well as off-farm help.

In this report, measurable costs are divided into operating and fixed costs. Operating costs are those costs that are paid in cash and are specifically used for the production of the flue-cured tobacco crop. Fixed costs are indirect or noncash costs that are incurred regardless of whether a crop is produced or not.

For the purpose of this study, the costs of the following were treated as operating costs: hired labor; labor benefits; repairs, maintenance, fuel, oil, and grease for tractors, trucks and machines; custom and machine rental; all materials, crop and produce insurance; building rental; repairs and maintenance for buildings; land rental; quota rental; interest on operating capital; accounting services; telephone and

electricity; farm maintenance costs for drainage repairs; yard maintenance; and an allowance for the use of car or pick-up truck or both.

The costs of the following were treated as fixed costs: operator's labor and unpaid family labor; depreciation, interest on investment, and housing for tractors, trucks, and machines; depreciation, interest on investment and insurance for the use of buildings; realty taxes and interest on investment for the use of land; and yearly allocated costs for the use of specialized tobacco equipment such as that used in the greenhouse and in the strip room for grading.

LABOR HOURS AND COSTS

All costs of hired labor were recorded as the amounts actually paid. All room and board supplied by the employer, transportation costs, and other related costs are also recorded as a cost of hired labor. Employee benefits paid by the employer, such as Workmen's Compensation, Canada Pension Plan, and unemployment insurance, are recorded as labor benefits.

Unpaid family labor consisted mainly of labor by the owner or operator and spouse, and was calculated at $6.00 per hour throughout the production year.

An allowance for management was included in the cost of producing tobacco; it was calculated at a rate of 5 percent of the gross returns obtained by each cooperating grower.

COSTS OF MATERIALS

This category comprised the actual costs to the grower for all materials (seed, mulch, fertilizer, sprays, curing fuels, and many others). No charge was made for materials used on the green manure crop plowed down for the current tobacco crop. Those materials consisted of rye or wheat seed, fertilizer, and sprays. It was assumed that the benefits derived from the previous grain crops were offset by the costs of growing, harvesting, and marketing time.

COSTS OF TRACTORS AND MACHINES

An hourly rate was calculated for each tractor, machine, and truck used on the tobacco crop on the basis of the age, purchase price, and total annual use. The rate includes an allowance for depreciation, interest on investment, repairs and maintenance, housing, insurance, grease, oil, and fuel.

Depreciation. This was calculated by the declining balance method, at 15 percent for tractors, trucks and powered machines and 10 percent for nonpowered equipment. For those tractors, trucks and machines that were fully depreciated, a present value was calculated instead of depreciation.

Interest on machinery investment. For all equipment not fully depreciated, interest was calculated on the depreciated value. For equipment fully depreciated, the interest charge was calculated on the present value as established.

The interest charge was calculated on the equity in the machinery investment. The equity portion of investment in machinery was assumed to be 70 percent, and the debt portion 30 percent. The interest charges were calculated as follows:

1. Equity portion: 15.63 percent, the average rate paid by chartered banks on deposit accounts for 1981.

2. Debt portion: 20.12 percent, consisting of the average prime rate for 1981 (19.12) plus 1 percent.

Insurance and housing (storage). For all machines these were based on a percentage of the machines purchase cost. The rate was 0.5 percent for insurance and 1.5 percent for machine housing or storage.

Repair and maintenance costs. Per hour rates were recorded through the use of the factsheet "Cost of Owning and Operating Farm Machines." For tractors and machines that were fully depreciated, hourly rates were calculated by determining the approximate cost of a replacement tractor or a machine of similar size and capacity.

Fuel, grease, oil, and filters. Were determined through consultation with the participating growers, and by the use of data supplied by the American Society of Agricultural Engineers. An average rate of fuel consumption was determined for each tractor, truck, and powered machine. For 1981 the average farm price for gasoline was 0.264¢ per litre ($1.20 per gallon) and for diesel fuel, 0.276¢ per litre ($1.25 per gallon). The hourly cost for oil, grease, and filters was calculated at 15 percent of the hourly fuel cost.

Insurance and licenses. These were charged for trucks where applicable.

Custom work. The actual amount of money paid to custom operators for such work as steaming greenhouse, preparing the land, spraying, and for the rental of machines such as fertilizer spreaders, steamers, and fumigant applicators was recorded.

COST ALLOWANCES FOR SPECIALIZED EQUIPMENT

Tobacco lath or slats — the total number of slats required in the harvest by the cooperators using standard kilns were valued by the growers, and a yearly charge of 19.38 percent was made. That rate is made up of the average farm credit interest rate for 1981 at 14.38 percent plus an allowance of 5 percent to cover depreciation and insurance costs.

It was difficult to determine the hours of use and other details on specialized tobacco equipment. In most cases, the equipment is either attached to, or located in, special areas on each tobacco farm or includes numerous small articles necessary in producing the crop. For this equipment, a yearly charge of 20 percent of the purchase cost was made. That includes depreciation of 4 percent, interest on investment of 14.38 percent (the average Farm Credit Corporation rate for 1981), repairs and maintenance of 1 percent, and insurance of 0.62 percent. The following equipment was included in this rate charge:

1. Greenhouse equipment: automatic waterers, plant pullers, ventilating fans, heaters, seeders, dusters, trays, and other specialized greenhouse equipment.

2. Planting equipment: hand replanters, small water pumps, and other specialized equipment.

3. Grading room equipment: total purchase cost of all the specialized equipment used in the grading room, such as grading table or belt,

humidifier, heaters, baling boxes, steaming racks, presses, forklifts, tumblers, and pallets was calculated.

4. Irrigation equipment: most farms in the study have some kind of irrigation equipment, and the investment in that equipment was considerable. In cases where the irrigation equipment was not used on the 1981 tobacco crop, a yearly cost based on 20 percent of the purchase cost was made. On farms where irrigation was done, the cost of operating the irrigation equipment was included under tractor and machine costs.

Racks for bulk kilns are included in the investment costs for the kilns and are therefore included in the section on building use.

COSTS OF BUILDINGS

The present value for all farm buildings directly related to tobacco production was determined through discussions with each participating grower and by an examination of assessment, insurance, and replacement values. Buildings not included were the operator's hours, houses rented to persons not connected with tobacco production, buildings not used in tobacco production, and implement sheds (allowance for machinery storage is made for all machines under tractor and machine costs).

Depreciation on buildings. All greenhouses, 2½ percent; bulk kilns, 4 percent; standard kilns, 5 percent; pack barns, bunk houses, and all other buildings, 5 percent.

Interest on building investment. 14.38 percent, which was the average Farm Credit Corporation interest rate for 1981.

Insurance. Because of the difficulty of determining the actual cost of insurance on tobacco buildings for all cooperators, an average insurance rate coverage was drawn up. The rate coverage was as follows.

Building	*Rate coverage*
Greenhouse	$1.75 per year per $100 value
Bulk kilns	$0.80 per year per $100 value
Standard kilns	$1.42 per year per $100 value
Pack barns & other tobacco storage	$1.39 per year per $100 value
Housing, hired help ...	$60.00 per year, minimum $10,000

Repairs and maintenance. The cost for annual repairs and maintenance was assessed.

Building	*Cost*
Greenhouse	$150.00 each
Bulk kilns	$50.00 each
Standard kilns	$75.00 each
Pack barns & other tobacco storage	$200.00 each
Housing, hired help ...	$300.00 each

When tobacco buildings such as greenhouses, curing kilns, and pack barns were rented, the actual rent paid was recorded.

LAND USE COSTS

The flue-cured tobacco crop was the only enterprise on every farm in the study, with the exception of some small acreages of grain corn on several farms. All study fields were measured, when applicable or possible to do so.

In this study it was assumed that two acres of land are needed to grow one acre of tobacco. The reason is that researchers recommend that a different crop, preferably rye, be grown every other year and entirely returned to the soil the following spring to benefit the succeeding tobacco crop. During years of high grain prices, some growers have been harvesting the rye or wheat but with a return to lower grain prices in 1981, more growers were returning to the custom of incorporating the entire rye crop into the soil. In any study of the economics of crop production, by far the most arduous task and certainly the most controversial is to determine an annual cost for the use of land.[1]

During the past two decades, purchasers of farmland have generally been willing to pay considerably more than can be justified by capitalizing the net return from agricultural production. The most important reason is that land has been considered to be a good hedge against inflation. Purchasers believe that the speculative aspect of owning land offers benefits over and above those received from crop production. For this reason it would be incorrect to charge the crop grown in a particular year with the full interest cost of carrying the land investment. In this study, interest on land investment is calculated as follows:

1. Land is valued on the basis of recent sales of bare land in the immediate area of cooperating farms; and

2. The interest rate applied is the current lending rate discounted for the rate of inflation, resulting in a rate of 3.5 percent.

Experience shows that this method results in an annual land use charge that corresponds closely with rental rates paid by farmers to landowners. The rental rates are a charge for the land only and do not contain any speculative element.

Readers who use this report for budgeting their operations in the short run may wish to replace the land-use cost with a land carrying cost that reflects their own specific situation.

For farms where the tobacco crop was the main enterprise, the total farm real estate taxes less the Ontario farm tax rebate were charged against the acreage of tobacco produced in 1981. If there were other crop enterprises or nonfarm homes, some adjustments were made in the amount of taxes charged to the tobacco crop.

The actual rent paid was recorded for the rental of tobacco land and additional quota pounds. No values were placed on the basic poundage quota allowance for each study farm.

INTEREST ON OPERATING CAPITAL

In the production of flue-cured tobacco, there is a need for operating capital to purchase muck, seed, fertilizer, sprays, hired labor, fuel for machines and curing, and so on. The need for operating capital begins early in the spring and continues until the grower is able to market his crop during the fall, winter, and spring of the following year.

No attempt was made in this study to find out the actual interest

---

[1]Gordon Framst, *A Method for Determining Enterprise Land Costs* (Toronto: Economics Branch, Ontario Ministry of Agriculture and Food, 1981.

rate charged by chartered banks and other lending institutions for the capital that the growers borrowed during the year to pay for the costs of tobacco production. That would prove very difficult, as some growers borrow all of their operating capital, not only for tobacco production but also for other purposes. More established growers, on the other hand, borrow part of their operating cash and obtain the rest from their own cash reserves.

In order to treat all cooperators the same, it was decided that the calculation of interest on operating capital would be as follows.

Preharvest operating costs. Comprising all materials, custom work, machine rentals, hired labor, labor costs such as room, meals, and transportation, and quota rentals, plus one-half the cost of fuel and repairs for tractors, trucks and machines, and real estate taxes. The interest rate was to be 20.12 percent (the average prime rate charged for 1981 plus 1 percent) for four and a half months. Four and a half months were chosen as the average time that the money was in use before the growers could begin selling their tobacco and repay the borrowed money.

Harvesting operating costs. Comprising all materials, custom work, machine rentals, hired labor, and labor costs plus half the cost of fuel and repairs for tractors, trucks, and machines. The interest rate on harvest operating costs was to be 20.12 percent for two months, as explained above under preharvesting operating costs.

Grading operating costs. Including the cost of hired labor only, at 20.12 percent for one month, as explained above under preharvest operating costs.

OTHER COSTS

Telephone and hydro. This included the yearly part of these expenses used for the tobacco business. Electricity used during harvest and grading operations for most study farms is included under costs for materials. On farms where this allocation was not made, electricity has been included under other costs.

Office expenses. Consisted of accounting services, any subscriptions, and membership fee pertaining to tobacco production.

General farm maintenance costs. consisted of drainage costs (not included under municipal real estate drainage taxes), fence repairs, maintenance of driveway and yard, and maintenance of irrigation ponds and water supply. These costs were to be allocated annually at 10 percent of the capital cost.

Transportation. The year's total mileage for the farm pick-up truck or car devoted to the tobacco business was calculated at 26.6 cents per mile.

MARKETING BOARD FEE

A fee of 2.2 cents per kilogram or (one cent per pound) is charged on the quantity of tobacco marketed. No Board fee is payable on insurance claims.

YIELDS AND RETURNS

The total amount of tobacco sold was recorded along with the value received for each farm in the study. The amounts received for insurance claims were recorded for growers who had crop losses.

VARIATION IN COSTS AND RETURNS FOR FARMS USING DIFFERENT METHODS OF HARVESTING AND CURING

To determine the differences between farms using different methods of harvesting and curing, the records for 42 cooperators were divided into three groups with the following designations:

1. The 13 farms that harvested with a priming aid and cured in bulk kilns are designated bulk cured;

2. The 22 farms that harvested with a priming aid and cured in standard kilns are designated standard cured; and

3. The 7 farms that harvested with a mechanical harvester and cured in bulk kilns are designated mechanical harvested.

GROSS RETURNS

Variations in yields as well as in prices received per kilogram accounted for considerable differences in gross returns per hectare among the three study groups (Table 3). The two larger groups were not adversely affected by extremes of weather, but a number of the mechanically harvested crops were. Because of the small size of the last group, valid comparisons cannot be made when a high percentage of grower's crops were affected by adverse weather. That should be remembered when readers are comparing results for the three groups.

All three groups on the average did not market all the tobacco that they grew, harvested, and cured. The standard cured crops yielded slightly higher at 2 554 kilograms per hectare compared to 2 404 kilograms for the bulk-cured crops. Out of this production, the standard-cured producers marketed 2 303 kilograms, which was only 46 kilograms more than the 2 257 kilograms marketed by the bulk group. Because of bad weather in the 1981 crop year, the farms in the mechanical-harvest group had a yield of only 2 100 kilograms per hectare and sold only 1 958 kilograms per acre. Consequently they obtained lower gross returns — $6,406 per hectare (Table 3).

Each group in the survey had some carry-over tobacco to be sold during the 1982 crop year. The average carry-over for all study farms was 195 kilograms. Because it was not known what the gross returns for that amount would be, the cost of storage, rental of quota allowance, and possible losses during storage, this report did not consider the carry-over tobacco.

For all the growers on the study, the average gross return per hectare was $7,409. That amount is about 6 percent greater than the $6,991 received per hectare by all growers in the main study area. The growers in the study also had an average yield per hectare that was about 6 percent higher than that of all the growers in the study area (Tables 2 and 3).

With operating costs of $4,817 per hectare for all the study farms, there was a gross margin of $2,592 per hectare (Table 3). Gross margin is the amount over operating costs that the flue-cured tobacco crop contributes to the operator for his wages and management and to the costs of owning machinery and land. The average gross returns per 50 kilograms

Table 3.—Costs and Returns for Flue-Cured Tobacco, Main Area,[a] Ontario, 1981

	All study farms	Priming aid & curing by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
Hectares per farm	20.70	22.38	18.63	24.08
YIELD PER HECTARE				
Produced:				
Total kg	2 416	2 404	2 554	2 100
Per 50 kg	48.32	48.08	51.08	42.00
Marketed:				
Total kg	2 221	2 257	2 303	1 958
Per 50 kg	44.42	45.14	46.06	39.16
Carry-over:				
Total kg	195	147	251	142
Per 50 kg	2.90	2.94	5.02	2.84
		dollars		
PER HECTARE				
Gross returns	7,409	7,588	7,695	6,406
Operating costs	4,817	4,727	5,018	4,482
Gross margin	2,592	2,861	2,677	1,924
Fixed costs	2,476	2,615	2,377	2,483
Measurable costs	7,293	7,342	7,395	6,965
Net returns	116	246	300	-559
PER 50 KILOGRAMS[b]				
Gross returns	166.79	168.10	167.07	163.58
Operating costs	99.79	98.36	98.36	106.80
Gross margin	67.00	69.74	68.71	56.78
Fixed costs	51.27	54.36	46.54	59.11
Measurable costs	151.06	152.72	144.90	165.91
Net returns	15.73	15.38	22.17	-2.33

[a]The main growing area for this and subsequent tables, where applicable, consists of the regional municipality of Haldimand-Norfolk and the counties of Brant, Elgin, and Oxford.

[b]Costs per 50 kg are weighted for costs required to grow and harvest all tobacco produced as well as for costs of grading and marketing only the tobacco sold during the 1981 marketing year.

for all growers in the study area was $167.57, or less than 1 percent more than the $166.79 received by all growers in the study (Tables 2 and 3).

PRODUCTION COSTS

Although there was little difference in total measurable costs per hectare between bulk and standard cured, variations did occur in the costs for individual inputs. Total operating costs per hectare for bulk cured were $4,727 and for standard cured, $5,018. Farms curing in standard

Table 4.—Average Measurable Costs per Hectare for Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	All study farms	Priming aid & curing by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
		dollars per hectare		
Operating costs:				
Hired labor	1,551	1,724	1,646	1,018
Labor benefits	115	128	128	59
Tractor	157	151	160	160
Machines & trucks	106	97	108	119
Custom & rentals	101	69	76	217
Materials	1,284	1,195	1,372	1,224
Building repairs	71	62	87	46
Building rental or lease	101	-	-	520
Insurance	258	253	251	284
Quota rental	257	218	327	155
Marketing Board fee	49	50	51	43
Int. on oprtg. capital	174	175	179	160
Management fee	370	379	385	320
Other[a]	223	226	248	157
Total	4,817	4,727	5,018	4,482
Fixed costs:				
Operator labor	719	649	846	537
Tractor	124	127	117	136
Machines & trucks	281	194	278	436
Specialized equipment	115	145	107	82
Land use	447	471	425	462
Building use	790	1,029	604	830
Total	2,476	2,615	2,377	2,483
TOTAL MEASURABLE COSTS	7,293	7,342	7,395	6,965

[a]Includes phone and electricity other than what has been allocated to harvest and grading costs; office costs for accounting; subscriptions and membership fees; farm maintenance such as drainage repairs and yard maintenance; and allowance for car or pick-up truck or both.

kilns had higher material costs, partly attributable to the higher costs for fuel. Because bulk kilns are insulated better, and have better circulation of heat and usually more efficient burners than standard kilns, they use less fuel (Tables 6 and 12). The mechanical-harvest group had lower costs for hired labor but reported a cost for building rental or lease, a cost not incurred by either of the other two groups. It is difficult to calculate the effect on costs per hectare that the handling of a reduced yield had on the average costs per hectare of the mechanical-harvest group.

As mentioned earlier in this report, there was considerable carry-over of unsold tobacco from the 1981 crop year to be marketed in 1982. Since most growers left their carry-over tobacco hanging in the kilns, there were no costs for grading, baling, and marketing to be assessed for

Table 5.—Average Measurable Costs per 50 Kilograms for Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	All study farms	Priming aid & curing by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
		dollars per 50 kilograms		
Operating costs:				
Hired labor	32.11	35.85	32.23	24.24
Labor benefits	2.37	2.67	2.50	1.42
Tractor	3.24	3.13	3.13	3.80
Machines & trucks	2.21	2.02	2.10	2.84
Custom & rentals	2.08	1.44	1.48	5.18
Materials	26.58	24.85	26.87	29.13
Building repairs	1.47	1.28	1.72	1.09
Building rental or lease	2.07	-	-	12.38
Insurance	5.34	5.26	4.91	6.75
Quota rental	5.32	4.53	6.41	3.69
Marketing Board fee	1.10	1.10	1.10	1.10
Int. on oprtg. capital	3.60	3.65	3.51	3.80
Management fee	7.67	7.89	7.53	7.63
Other[a]	4.63	4.69	4.87	3.75
Total	99.79	98.36	98.36	106.80
Fixed costs:				
Operator labor	14.89	13.50	16.56	12.78
Tractor	2.56	2.64	2.28	3.23
Machines & trucks	5.83	4.03	5.46	10.39
Specialized equipment	2.38	3.02	2.09	1.94
Land use	9.26	9.78	8.33	11.01
Building use	16.35	21.39	11.82	19.76
Total	51.27	54.36	46.54	59.11
TOTAL MEASURABLE COSTS	151.06	152.72	144.90	165.91

[a]See footnote Table 4.

that tobacco for the 1981 crop year. On the other hand, the total amount of tobacco produced in 1981 (including not only the amount sold but also the carry-over) incurred costs for growing, harvesting, and curing, which were assessed to the 1981 crop year.

In this study, all costs, either operating or fixed, for materials, labor, tractors, machines, custom charges, insurance, specialized equipment, use of land and buildings, and any other costs required to grow, harvest, and cure the tobacco crop were assessed to the entire production obtained per hectare. Similarly, all the costs required to grade, bale, and market, including the Marketing Board fee and the management fee, were assessed only to the marketed portion of the crop.

Table 6.—Cost of Materials for Growing Flue-Cured Tobacco, Main Area, Ontario, 1981

	All study farms	Priming aid & curing by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
		dollars per hectare		
Greenhouse:				
Muck	14.03	20.22	11.77	8.82
Fertilizer	3.92	4.80	3.41	3.61
Sprays	5.42	6.36	4.89	5.06
Mulches	3.13	1.51	3.20	5.73
Seed	3.65	4.07	3.66	2.88
Steaming fuel	5.93	4.75	5.94	7.96
Soil Fumigant	2.02	.85	2.78	2.21
Miscellaneous	1.10	-	-	5.67
Total	39.20	42.56	35.65	41.94
Seedbed:				
Manure	35.68	48.03	35.57	14.65
Fertilizer	39.47	28.05	44.45	47.05
Insecticide	26.68	23.58	29.49	25.19
Nematicide	176.60	167.07	174.75	197.55
Herbicide	20.49	22.77	16.74	25.64
Miscellaneous	1.18	-	2.49	-
Total	300.10	289.50	303.49	310.08
Planting:				
Fertilizer	240.87	169.41	256.44	326.33
Plant starter	5.40	8.63	5.27	.15
Miscellaneous	2.58	3.29	2.95	.45
Total	248.85	181.33	264.66	326.93
Summer:				
Fertilizer	43.21	72.04	31.92	20.89
Insecticide	18.33	17.27	17.83	21.37
Sucker control	93.32	85.40	98.00	95.63
Ethrel	13.81	23.60	12.55	-
Ridomil	54.35	44.75	56.79	65.02
Total	223.02	243.06	217.09	202.91
Harvest:				
Curing fuel	372.51	336.05	452.95	239.90
Tying string	9.37	.41	19.59	-
Clothing	6.05	2.20	5.66	13.66
Electricity	42.08	64.68	19.79	57.28
Total	430.01	403.34	497.99	310.84
Grading:				
Paper	14.37	13.53	16.30	11.21
Baling twine	14.29	15.54	15.35	9.55
Heating	11.56	5.79	19.61	2.59
Electricity	2.82	.35	2.64	7.51
Total	43.04	35.21	53.90	30.86
TOTAL	1,284.22	1,195.00	1,372.78	1,223.56

Table 7.—Cost Inputs as a Percentage of Total Costs for Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	All study farms	Priming aid & curing by		Mechanical harvest
		Bulk	Standard	
	percent			
Operating costs:				
Hired labor	21.3	23.4	22.4	14.6
Labor benefits	1.6	1.7	1.7	.8
Tractor	2.1	2.0	2.3	2.3
Machines & trucks	1.4	1.3	1.5	1.6
Custom & rentals	1.4	.9	1.0	3.0
Materials	17.6	16.2	18.5	17.6
Building repairs	1.0	.8	1.2	.7
Bldg. rental or lease	1.4	-	-	7.5
Insurance	3.5	3.4	3.4	4.1
Quota rental	3.5	3.0	4.4	2.2
Marketing Board fee	.7	.7	.7	.6
Int. on oprtg. capital	2.4	2.3	2.4	2.2
Management fee	5.1	5.2	5.2	4.6
Other[a]	3.0	3.1	3.3	2.2
Total	66.0	64.0	68.0	64.0
Fixed costs:				
Operator labor	9.9	8.9	11.4	7.8
Tractor	1.7	1.8	1.6	2.0
Machines & trucks	3.9	2.7	3.7	6.3
Sepcialized equipment	1.6	2.0	1.4	1.3
Land use	6.1	6.5	5.7	6.6
Building use	10.8	14.1	8.2	12.0
Total	34.0	36.0	32.0	36.0
TOTAL MEASURABLE COSTS	100.0	100.0	100.0	100.0

[a]See footnote Table 4.

After those costs were apportioned either to the total production or the marketed production, the costs for each were calculated on a per 50 kilogram amount and combined. On this basis, the total measurable cost for all the growers in the study was $151.06 per 50 kilograms. This cost was made up of $99.79 per 50 kilograms, or 66 percent, for operating costs and $151.27 per 50 kilograms or 34 percent, for fixed costs (Tables 5 and 7).

LABOR COSTS

HOURS

Flue-cured tobacco is a labor-intensive crop that requires large amounts of labor at certain times of the year, especially during field planting and harvesting, when timeliness and speed are important. Over the years, machinery suppliers and individual farmers have invented or devised labor-saving machines.

Table 8.—Average Use of Labor per Hectare, Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	All study farms		Priming aid & curing by: Bulk		Priming aid & curing by: Standard		Mechanical harvest	
No. of farms	42		13		22		7	
Ha per farm	20.70		22.38		18.63		24.08	
Yld. per ha, kg:								
Harvested	2 416		2 404		2 554		2 100	
Marketed	2 221		2 257		2 303		1 958	
	Hours per hectare							
	Op.	Hired	Op.	Hired	Op.	Hired	Op.	Hired
Preharvest:								
Greenhouse	9.3	1.4	11.0	1.1	9.5	1.5	5.8	1.6
Land prep.	7.0	.7	6.2	.9	7.8	.4	6.6	1.1
Planting	10.5	31.0	9.2	33.8	9.6	30.1	14.9	28.4
Summer	18.2	29.5	17.2	39.3	20.2	24.6	14.9	24.5
Total	45.0	62.6	43.6	75.1	47.1	56.6	42.2	55.6
Harvest:								
Harvesting	38.5	150.0	39.0	169.1	46.0	181.9	19.4	39.0
Grading	31.0	60.0	21.7	63.7	40.6	57.3	23.9	59.6
Marketing	2.0	.3	1.9	.1	2.0	.3	1.8	.3
Total	71.5	210.3	62.6	232.9	88.6	239.5	45.1	98.9
Total:								
Per hectare	116.5	272.9	106.2	308.0	135.7	296.1	87.3	154.5
Per 50 kg	2.5	5.9	2.2	6.4	2.8	6.1	2.1	3.8
TOTAL								
Per hectare	389.4		414.2		431.8		241.8	
Per 50 kg	8.4		8.6		8.9		5.9	

NOTE: Operator hours consist mainly of owner and spouse.

One of the latest of those is the mechanical harvester, which requires two to four persons for harvesting operations. The mechanical harvester travels through the tobacco field, removing leaves as it travels and depositing them in a bin. In addition to the operator, another person may travel on the harvester to level the freshly harvested leaves in the bin. When full, the bin is removed from the harvester and transported to a bulk kiln, where it is placed in the kiln for curing. The leaves are left to cure as deposited in each bin and are known as "tangled leaves." When cured, the leaves must be graded and baled immediately.

In comparison, the other two harvest systems use a priming aid in the field and, for the conventional cured crops, a tying machine and elevator in the kiln yard. The bulk-cured crops use only a bulk-racking crew in the kiln yard.

The bulk-harvest growers used a total of 414.2 labor hours per hectare to grow, harvest, and sell their tobacco; the standard-harvest growers used 431.8 hours; and the mechanical-harvest growers, 241.8 hours (Table 8). When total labor hours are calculated per 50 kilograms, the mechanical

Table 9.—Average Seasonal Costs in Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	All study farms	Priming aid & curing by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
Ha grown per farm	20.70	22.38	18.63	24.08
		dollars per hectare		
Preharvest:				
Greenhouse	149	160	150	125
Land preparation	464	455	465	477
Planting	565	525	565	637
Summer operations	704	752	715	595
Total	1,882	1,892	1,895	1,834
Harvest & marketing:				
Harvest & cure	1,850	1,797	2,063	1,422
Grading for market	600	575	628	576
Marketing	49	46	50	52
Total seasonal operations	4,381	4,310	4,636	3,884
Overhead:				
Marketing Board fee	49	50	51	43
Land use	447	471	425	462
Building use	962	1,091	691	1,396
Insurance	258	253	251	284
Quota rental	257	218	327	155
Interest on oprtg. capital	174	175	179	160
Management fee	370	379	385	320
Other	395	395	450	261
Total	2,912	3,032	2,759	3,081
TOTAL MEASURABLE COSTS	7,293	7,342	7,395	6,965

harvest group used 5.9 hours, the bulk group 8.6 hours, or 46 percent more, and the standard group, 8.9 hours, or 51 percent more than the mechanical-harvest growers (Table 8).

There is a growing trend for tobacco producers to use more labor-saving equipment in all phases of tobacco production. Among the reasons for that trend are a shortage of qualified tobacco workers and a desire to reduce labor costs.

COSTS

The cost of hired labor per 50 kilograms was $24.24 for the mechanical-harvest group, $35.85 for the bulk group, and $32.23 for the standard group. However, machine and custom and rental machine costs were $25.44 for the mechanical-harvest group, $13.26 for the bulk group, $14.45 for the standard group (Tables 5 and 7).

Table 10.—Plants Used in Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	No. of farms	Hectares		Number of plants per hectare
		No.	Percent	
PRIMING AID HARVEST[a]				
Variety:				
Delgold	15	285	41	15,952
Virginia 115	13	265	38	16,011
Nordel	3	76	11	16,928
Delhi 76	2	40	5	16,377
Others	2	35	5	15,378
Total	35	701	100	16,075
MECHANICAL HARVEST				
Variety:				
Delgold	4	87	51	16,634
Virginia 115	3	82	49	16,973
Total	7	169	100	16,757

[a]Priming aid harvest refers to farms that used a priming aid and cured either in bulk or standard kilns.

Therefore, growers who are contemplating the purchase of labor-saving equipment will have to consider the increased cost of owning that equipment as well as the reduction in the costs and problems associated with the laborers.

SEASONAL COSTS

The production of flue-cured tobacco can be divided into seven periods during the crop year:

1. Greenhouse operations;
2. Preparing the land;
3. Planting;
4. Summer operations;
5. Harvesting and curing;
6. Grading; and
7. Marketing.

Growing or preharvest costs can include greenhouse operations, land preparation, planting, and summer operations. In each of these periods or operations there are costs for labor, tractor, machines, custom work, materials, and the use of specialized machines. In addition there are many costs that cannot be allocated to any one period or operation during the crop year. Those include land, insurance, quota rentals, and the use of buildings.

The total allocated seasonal costs for all growers in the study amounted to $4,381 per hectare, or 61 percent of the total measurable costs (Table 9).

Table 11.—Use of Fertilizer in Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	No. farms	ha/ farm	Fertilizer $	Fertilizer kg	Nutrients N	Nutrients P	Nutrients K	Nutrients Total
FERTILIZER APPLIED			per ha			kg per ha		
Seedbed:								
Priming aid[a]	15	18.6	95	316	10	36	51	97
Mechanical	6	24.2	55	295	2	63	29	94
Using fertilizer	21	20.2	81	309	7	45	44	96
All farms on study	42	10.1	40	151	3	22	22	47
Planting:								
Priming aid[a]	33	19.4	241	1,041	28	146	200	374
Mechanical	7	24.1	326	1,218	27	190	218	435
Using fertilizer	40	20.2	259	1,078	28	155	203	386
All farms on study	42	19.2	240	1,004	26	145	189	360
Side-dress:								
Priming aid[a]	17	19.6	102	340	11	31	60	102
Mechanical	2	25.9	68	272	11	26	52	89
Using fertilizer	19	20.3	96	331	11	31	59	101
All farms on study	42	9.2	43	146	5	13	26	44
All fertilizer applied:								
Priming aid[a]	35	20.0	306	1,240	35	163	231	429
Mechanical	7	24.1	394	1,556	32	252	259	543
All farms	42	20.7	323	1,301	34	180	237	451

[a]See footnote Table 10.

Although the yields obtained and the method of harvesting system used may affect the costs of harvesting and grading, they do not have any affect on preharvest costs. In this study, preharvest costs per hectare ranged from $1,834 for mechanical harvesting, to $1,892 for bulk and $1,895 for standard. For all growers, the average preharvest costs were $1,882 per hectare (26 percent of total measurable costs).

Harvesting costs for all growers were $1,850 per hectare (25 percent of total measurable costs). As a result of the yields harvested and the harvesting system used, these costs showed a wide range, from $1,422 per hectare for mechanical harvest to $1,797 for bulk harvest and $2,063 for growers who used priming aids and cured in standard kilns (Table 9).

The marketing costs for this study covered the loading, trucking, and selling costs for the tobacco that was sold in the 1981 marketing year. The Marketing Board fee has been listed separately. The average costs for marketing amounted to a very small amount, $49 per hectare or less than 1 percent of total costs (Table 9).

PRACTICES USED BY GROWERS IN THIS STUDY

Information was obtained during the study on some of the production practices followed by the 42 tobacco growers. This section discusses planting, fertilizer practices, and the use and costs of fuel.

PLANTING

The number of plants per hectare varies from farm to farm and depends on the variety, type of soil, fertility, and method of harvesting. The average number of plants per hectare for the 35 growers who used a priming aid was 16,075 (Table 10). The growers in the study who used a mechanical harvester had an average of 16,675 plants per hectare, or abour 4 percent more than the conventional harvest growers (Table 10).

Among the conventional harvest growers, the most popular variety grown was Delgold, which made up 41 percent of their total production. It was followed closely by Virginia 115, which made up 38 percent of the total production for this group. Of the remaining recommended varieties for Ontario (Publication 298, *1981 Tobacco Production Recommendations)*, Nordel made up 11 percent, Delhi 76 at 5 percent, and other nonrecommended varieties 5 percent (Table 10).

The growers who harvested with a mechanical harvester grew two varieties: Delgold accounted for 51 percent of their acreage and Virginia 115 for the remaining 49 percent (Table 10).

FERTILIZING

The use of adequate amounts of fertilizer is important to the production of flue-cured tobacco. Most growers were careful to determine the need for fertilizer by a soil test along with information on type of soil, cropping practices, yield, and the quality of the tobacco usually produced on their farms.

The average amount of fertilizer applied per hectare for the 42 growers on study was 1 301 kilograms. Forty of the 42 growers applied 1 004 kilograms, or 77 percent, of their fertilizer at the time of planting. Only half the growers (21 out of 42) applied fertilizer when they were preparing the seedbed. That quantity amounted to 151 kilograms, or 12 percent, of the total fertilizer applied. The remaining 146 kilograms, or 11 percent, were applied by 19 out of 42 growers as a side-dress fertilizer (Table 11).

In this study the mechanical-harvest growers applied 1 556 kilograms of fertilizer per hectare, or 316 kilograms more than the 1 240 kilograms used by the conventional-harvest growers. There are many reasons for using varying quantities of fertilizer, but the mechanical-harvest growers as a group did have more plants per hectare, 16,757 as compared to 16,075 for the conventional harvest group (Tables 10 and 11).

The ratio of the nutrients — nitrogen (N), phosphate (P), potash (K) — applied per hectare for the average of all growers in the study was N = 34 kg, P = 180 kg, and K = 237 kg, or 1.0: 5.3: 7.0, which is equivalent to about 1 300 kilograms per hectare of a 3-14-18 analysis (Table 11).

USE AND COSTS OF CURING FUEL

The farmers in the study used three types of fuel for curing their tobacco crops. Providing the burners are in good condition and the cure-person operates them correctly, the quality of tobacco cured should not be affected by the kind of fuel that is used.

For all growers in the study, more tobacco was cured by natural gas at 61 percent of total (1,059 kilns, or a total of 1 259 502 kilograms) than by oil at 24 percent (404½ kilns, or 488 240 kilograms) or propane at 15 percent (288 kilns, or 321 887 kilograms). The cost per kiln or per 50 kilograms for the curing fuel varied considerably depending on the type of fuel used, the type of kiln, i.e., standard or bulk, and how well the kiln was insulated. The average cost for curing a kiln of tobacco was lowest for natural gas: in bulk kilns, $107 per kiln, or $4.70 for each 50 kilograms of tobacco cured. For standard kilns, the cost of natural gas was $161 per kiln, or $6.46 for each 50 kilograms of tobacco cured (Table 12).

The next most common fuel was oil, which cost $232 per kiln for bulk kilns, or $11.20 per 50 kilograms of tobacco cured; that was nearly 2.4 times as much as for natural gas. For standard kilns, the cost of oil was $311 per kiln, or $12.22 per 50 kilograms. That was 1.9 times as much as for natural gas in standard kilns (Table 12).

In this study, the cost of propane was slightly lower than oil for both kinds of kilns, but considerably higher than for natural gas. For bulk kilns, the cost of propane was $10.48 per 50 kilograms, or 123 percent higher than the cost of natural gas. For standard kilns, the cost of curing with propane was $12.00 per 50 kilograms, 86 percent higher than for using natural gas (Table 12).

Table 12.—Comparison of Curing Fuel Costs for Flue-Cured Tobacco Production, Main Area, Ontario, 1981

Harvest & curing method	Oil				Propane				Natural gas			
	No. Kilns	Cost per Kiln	Cost per 50 kg	kg per kiln	No. kilns	Cost per Kiln	Cost per 50 kg	kg per kiln	No. kilns	Cost per Kiln	Cost per 50 kg	kg per kiln
		$	$			$	$			$	$	
Priming aid & standard cured	292½	311	12.22	1 273	62	327	12.00	1 362	473	161	6.46	1 246
Priming aid & bulk cured	112	232	11.20	1 036	180	202	10.18	992	327	108	4.70	1 148
Mechanical harvest & bulk cured[a]	-	-	-	-	--	--	--	--	259	105	4.61	1 139
Total:												
Bulk kilns	112	232	11.20	1 036	226	220	10.48	1 050	586	107	4.70	1 139
All kilns	404½	289	11.97	1 207	288	243	10.87	1 118	1,059	131	5.51	1 189

[a]Mechanical harvest and bulk cured not recorded for propane (one farm only) but is included in total.
- = nil.
-- = confidential.

APPENDIX

Appendix Table 1.—Costs and Returns for Flue-Cured Tobacco, Main Area,[a] Ontario, 1981

	All farms	Prim. aid & cured		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
Acres per farm	51.15	55.30	46.03	59.51
		pounds		
Yield per acre:				
Produced	2,155	2,145	2,278	1,873
Marketed	1,981	2,014	2,055	1,747
Carry-over	174	131	223	126
		dollars		
Per acre:				
Gross returns	2,999	3,071	3,114	2,593
Operating costs	1,950	1,913	2,031	1,814
Gross margin	1,049	1,158	1,083	779
Fixed costs	1,002	1,058	962	1,005
Measurable costs	2,952	2,971	2,993	2,819
Net returns	47	100	121	-226
Per 100 lbs.:[b]				
Gross returns	151.39	152.48	151.53	148.42
Operating costs	90.52	89.24	89.23	96.91
Gross margin	60.87	63.24	62.30	51.51
Fixed costs	46.49	49.33	42.23	53.64
Measurable costs	137.01	138.57	131.46	150.55
Net returns	14.38	13.91	20.07	-2.13

[a] The main growing area for this and subsequent tables, where applicable, consists of the regional municipality of Haldimand-Norfolk and the counties of Brant, Elgin, and Oxford.

[b] Costs per 100 pounds are weighted for cost of growing and harvesting all tobacco produced as well as the cost of grading and marketing only that tobacco sold during the 1981 marketing year.

Appendix Table 2.—Average Measurable Costs per Acre for Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	All farms	Priming aid & cured by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
		dollars per acre		
Operating costs:				
Hired labor	627.77	697.58	666.29	411.96
Labor benefits	46.43	51.96	51.70	24.05
Tractor	63.41	60.88	64.65	64.72
Machines & trucks	43.10	39.39	43.57	48.34
Custom & rentals	40.86	28.06	30.59	87.99
Materials	519.59	483.60	555.33	495.17
Bldg. repairs	28.67	24.97	35.45	18.58
Bldg. rent or lease ..	40.82	-	-	210.46
Insurance	104.32	102.29	101.48	114.74
Quota rental	104.05	88.11	132.39	62.68
Marketing Board fee ..	19.81	20.14	20.55	17.47
Int. on oprtg. cap. ..	70.45	70.99	72.51	64.52
Management fee	149.92	153.54	155.70	129.63
Other[a]	90.33	91.42	100.53	63.65
Total	1,949.53	1,912.93	2,030.74	1,813.96
Fixed costs:				
Operator labor	291.00	262.59	342.43	217.13
Tractor	50.13	51.45	47.21	54.97
Machines & trucks	113.64	78.53	112.66	176.56
Specialized equip. ...	46.53	58.76	43.29	32.99
Land use	181.13	190.43	172.06	187.09
Building use	319.62	416.37	244.24	335.92
Total	1,002.05	1,058.13	961.89	1,004.66
TOTAL MEASURABLE COSTS	2,951.58	2,971.06	2,992.63	2,818.62

[a]Other costs include the use of a phone and electricity other than what has been allocated to harvest and grading costs; office costs for accounting, subscriptions, and membership fees; farm maintenance such as drainage repairs and yard maintenance; and allowance for use of car or pick-up truck or both.

Appendix Table 3.—Average Cost of Materials per Acre for Growing Flue-Cured Tobacco, Ontario, 1981

	All farms	Priming aid & cured by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
		dollars per acre		
Greenhouse:				
Muck	5.68	8.18	4.76	3.57
Fertilizer	1.58	1.94	1.38	1.46
Sprays	2.19	2.58	1.98	2.05
Mulches	1.26	.61	1.30	2.32
Seed	1.48	1.65	1.48	1.17
Steaming fuel	2.40	1.92	2.40	3.22
Soil fumigant	.82	.34	1.13	.90
Miscellaneous	.45	-	-	2.29
Total	15.86	17.22	14.43	16.98
Seedbed:				
Manure	14.44	19.44	14.39	5.93
Fertilizer	15.97	11.35	17.99	19.04
Insecticide	10.80	9.54	11.93	10.19
Nematicide	71.47	67.61	70.72	79.95
Herbicide	8.29	9.22	6.77	10.38
Miscellaneous	.40	-	.88	-
Total	121.37	117.16	122.68	125.49
Planting:				
Fertilizer	97.47	68.56	103.78	132.06
Plant starter	2.19	3.49	2.13	.06
Miscellaneous	1.00	1.31	1.10	.18
Total	100.66	73.36	107.01	132.30
Summer:				
Fertilizer	17.49	29.16	12.91	8.46
Insecticide	7.42	6.99	7.22	8.65
Sucker control	37.77	34.56	39.66	38.70
Ethrel	5.59	9.55	5.08	-
Ridomil	22.00	18.11	22.98	26.31
Total	90.27	98.37	87.85	82.12
Harvest:				
Curing fuel	150.75	136.00	183.31	97.08
Tying string	3.79	.17	7.93	-
Clothing	2.45	.89	2.29	5.53
Electricity	17.03	26.18	8.01	23.18
Total	174.02	163.24	201.54	125.79
Grading:				
Baling paper	5.81	5.48	6.60	4.54
Baling twine	5.78	6.29	6.21	3.86
Heating	4.68	2.34	7.94	1.05
Electricity	1.14	.14	1.07	3.04
Total	17.41	14.25	21.82	12.49
TOTAL MATERIALS	519.59	483.60	555.33	495.17

Appendix Table 4.—Average Costs for Tractors, Machinery, and Trucks for Flue-Cured Tobacco Production, Main Area, Ontario, 1981

	All farms	Priming aid & cured by		Mechanical harvest
		Bulk	Standard	
Number of farms	42	13	22	7
		dollars per hectare		
Tractors:				
Depreciation	43.04	47.10	41.38	40.07
Interest	69.27	68.35	64.50	82.44
Housing	11.57	11.69	10.76	13.32
Repairs	45.98	40.26	48.33	50.15
Fuel	110.69	110.19	111.41	109.79
Total:				
Operating	156.67	150.45	159.74	159.94
Fixed	156.67	150.45	159.74	159.94
TOTAL OPERATING & FIXED ...	280.55	277.59	276.38	295.77
Machinery:				
Depreciation	93.06	58.95	80.54	182.36
Interest	154.69	109.80	162.75	212.54
Housing	26.38	18.51	26.02	40.87
Repairs	74.68	68.86	78.58	75.21
Fuel	27.90	23.76	24.68	42.88
Total:				
Operating	274.13	187.26	269.31	435.77
Fixed	102.58	92.62	103.26	118.09
TOTAL OPERATING & FIXED ...	376.71	279.88	372.57	553.86
Trucks:				
Depreciation	1.22	.95	1.91	-
Interest	4.18	4.32	5.69	.25
Housing	1.27	1.51	1.52	.27
Repairs	2.03	1.96	2.72	.50
Fuel	1.89	2.77	1.68	.89
Total:				
Operating	6.67	6.78	9.12	.52
Fixed	3.92	4.73	4.40	1.39
TOTAL OPERATING & FIXED ...	10.59	11.51	13.52	1.91
Tractor, mach., & truck:				
Operating	404.68	321.18	395.07	572.12
Fixed	263.17	247.80	267.40	279.42
Total	667.85	568.98	662.47	851.54

Appendix Table 5.—Average Measurable Costs per Hectare for Flue-Cured Tobacco Production, Conventional Harvest, Main Area, Ontario, 1974

	All farms
Number of farms	12
Hectares per farm	17.4
Marketed yield per ha, kilograms	2,511
Per hectare:	dollars
Gross returns	5,058
Measurable costs	4,875
Net returns to risk & management	183
Per 50 kilograms:	
Gross returns	100.72
Measurable costs	97.07
Net returns to risk & management	3.65
OPERATING & FIXED COSTS PER HECTARE	
Labor:	
Family, fixed	678.56
Hired, operating	997.15
Labor benefits, operating	39.02
Total	1,714.73
Tractors:	
Operating	46.70
Fixed	70.05
Total	116.75
Machines & trucks:	
Operating	88.16
Fixed	272.55
Total	360.71
Other:	
Custom, operating	41.51
Materials, operating	632.92
Insurance, operating	146.68
Marketing Board fee, operating	54.86
Taxes and/or rent, operating	160.59
Interest on operating capital, operating	89.65
Electricity & telephone, operating	14.16
Land use, fixed	1,043.53
Building use, fixed	357.60
Miscellaneous:	
Operating	9.07
Fixed	132.47
Total:	
Operating	2,320.47
Fixed	2,554.76
Total	4,875.23

Source: *Flue-Cured Tobacco Production in Ontario, Production Costs and Returns, 1974*, pp. 9, 10.

REFERENCES

Fisher, G.A. *Flue-Cured Tobacco Production in Ontario, Costs, Returns, and Management Practices.* Toronto: Economics Branch, Ontario Ministry of Agriculture and Food, 1972.

Fisher, G.A., and L.L. Davies. *Flue-Cured Tobacco Production in Ontario, Production Costs and Returns, 1974.* Toronto: Economics Branch, Ontario Ministry of Agriculture and Food, 1975.

Framst, Gordon. *A Method for Determining Enterprise Land Costs.* Toronto: Economics Branch, Ontario Ministry of Agriculture and Food, 1981.

Ontario Tobacco Production Recommendations. Publication 298. Toronto: Ontario Ministry of Agriculture and Food, Annual.

_____. *Ontario Flue-Cured Tobacco Growers' Marketing Board, Annual Report.* Tillsonburg, Ontario, Annual.

RECENT PUBLICATIONS FROM THE ECONOMICS BRANCH
OF THE ONTARIO MINISTRY OF
AGRICULTURE AND FOOD

Agricultural Statistics for Ontario, 1981, by Statistics Section.

The Cost of Establishing a Peach Orchard in Ontario, by E.D. McKibbon. Economics Information, Aug. 1980.

Economics of Hay Production in Ontario, 1979, by G.A. Fisher. Economics Information, Mar. 1981.

Rural Real Estate Prices in Ontario, 1979, by Tonu Tosine. Economics Information, Mar. 1981.

The Ontario Potato Industry, Production, Consumption, Trade, Marketing, and Distribution, by P. Regli. Economics Information, April 1981.

A Method for Determining Enterprise Land Costs, by G. Framst. Economic Research, May 1981.

The Turkey Industry in Ontario, by A. Contini. Economics Information, July 1981.

The Cost of Establishing a Vineyard in Ontario, by E.D. McKibbon. Economics Information, Aug. 1981.

On-Farm Drying and Storage Costs for Corn, Ontario, 1978 and 1979, by G.A. Fisher. Economics Information, Dec. 1981.

The Economics of Soybean Production in Ontario, 1980, by G.A. Fisher. Economics Information, Dec. 1981.

The Impact of Metric Conversion of Packaging on Fluid Milk Consumption: A Case Study of the Thunder Bay Market, by Tom Crozier. Economic Research, Feb. 1982.

Estimated Cost of Growing Potatoes, 1981, by B. Campbell. Economics Information, Mar. 1982.

Beef Feedlot Cost Study, Southern and Western Ontario, 1981, by F.R. Abraham, Economics Information, June 1982.

A Survey of Custom Farmwork Rates Charged in Ontario, 1982, by G.A. Fisher. Economics Information, Jan. 1983.

Single copies of the above publications are available on request from the Economics Branch, Ontario Ministry of Agriculture and Food, Legislative Buildings, Queen's Park, Toronto, Ontario, M7A 1B6.

ISBN 0-7743-8102-7 *83-02-15 2M*